CLAIMS:

What is claimed is:

1. A sampling rate converter for altering an initial sampling rate to a desired sampling rate resulting in near-unity fractional sampling rate alteration, comprising:

an interpolator for receiving and up-sampling digital data representing a continuous waveform signal, the digital data having a first sampling rate, wherein the interpolator produces upsampled and filtered data at a second rate;

a clampled cubic spline (CCS) intepolator for producing down sampled data based on the upsampled and filtered data wherein a ratio defined by the first and second data rates is near-unity; and

wherein the CCS intepolator implements a cubic polynomial in logic, and further wherein the CCS interpolator includes:

derivative estimation block for producing derivative estimates of a data sequence;

CCS coefficient calculation block for producing coefficient values of the cubic polynomial based on the derivative estimates and a buffered sequence of samples; and

CCS evaluation block for producing the down sampled data based upon the derivative estimates, the coefficient values of the cubic polynomial and a specified value of time, x, and further based upon a trigger to produce the down sampled data.

2. The sampling rate converter of claim 1 further including a buffer for producing the buffered sequence of samples of a sample stream forming the digital data wherein the buffered sequence of samples are produced to the derivative estimation block and wherein the buffered sequence of samples are based upon the digital data.

3. The sampling rate converter of claim 1 further including a buffer for producing a buffered sequence of samples of a sample stream forming the digital data wherein select buffered sequence sample values are produced to the coefficient calculation block and wherein the select buffered sequence of samples are based upon the digital data.

4. The sampling rate converter of claim 1 wherein the interpolator comprises a first sampling doubler for producing a first doubled sampling rate based on the digital data and a first low pass filter for digitally filtering the first doubled sampling rate.

5. The sampling rate converter of claim 4 wherein the interpolator comprises a second sampling doubler for producing a second doubled sampling rate based on the digitally filtered first doubled sampling rate and a second low pass filter for digitally filtering the second doubled sampling rate.

6. The sampling rate converter of claim 5 wherein the interpolator comprises a third sampling doubler for producing a third doubled sampling rate based on the digitally filtered second doubled sampling rate and a third low pass filter for digitally filtering the third doubled sampling rate wherein the digital data has been upsampled a total of eight times at the output of the third doubled sampling rate.

7 The sampling rate converter of claim 5 wherein the interpolator comprises an Nth sampling doubler for producing an Nth doubled sampling rate based on the (Nth-1) doubled sampling rate and an Nth low pass filter for digitally filtering the (Nth - 1) doubled sampling rate.

8. The sampling rate converter of claim 1 further including an accumulator that generates the trigger at approximate sampling points of the desired sampled rate based upon a received clock and upon a desired sampling rate.

9. The sampling rate converter of claim 8 wherein the CCS evaluation block receives a value of (x) and the trigger one of every seventh or eighth data value of the upsampled data and produces a sampling point estimate value upon receiving the trigger based upon the coefficient values.

10. The sampling rate converter of claim 8 wherein the CCS evaluation block receives the value of (x) and the trigger at a rate that is an integer value that is within ten percent of the value of the total number of times that the digital data was upsampled and produces the sampling point estimate value upon receiving the trigger to provide near-unity sampling rate conversion.

11. The sampling rate converter of claim 8 wherein the value of (x) is specified in a table and wherein the value of (x) is sequentially produced from values listed within the table.

12. The sampling rate converter of claim 11 wherein the specified table includes total of twenty entries.

13. A method for near-unity fractional sampling rate alteration, comprising:

receiving and up-sampling digital data representing a continuous waveform signal, the digital data having a first sampling rate, wherein an interpolator produces upsampled data at a second sampling rate;

filtering the upsampled data;

producing decimated data from a clampled cubic spline (CCS) intepolator wherein a ratio defined by the first and second data rates is near-unity; and

wherein the CCS interpolator implements a cubic polynomial in logic, and further wherein the CCS interpolator further performs the following steps:

producing derivative values of estimates of a data sequence;

producing coefficient values of the cubic polynomial; and

receiving a trigger value and a specified value of (x) and producing data at a down sampled data rate based upon the derivative values, the coefficient values and the specified value of (x).

14. The method of claim 13 further including producing a buffered sequence of samples of a sample stream forming the digital data wherein the buffered sequence values are based upon the digital data.

15. The method of claim 13 further including producing a buffered sequence of samples of a sample stream forming the digital data wherein select buffered sequence sample values are produced to a coefficient calculation block and wherein the select buffered sequence of samples are based upon the digital data.

16. The method of claim 13 wherein the digital data is upsampled by a factor of two.

17. The method of claim 13 further including upsampling and digitally filtering the upsampled data to produce a twice upsampled data.

18. The method of claim 17 wherein the twice upsampled data is upsampled by a factor of two.

19. The method of claim 17 further including upsampling and digitally filtering the twice upsampled data to produce a thrice upsampled data.

20. The method of claim 19 wherein the thrice upsampled data is upsampled by a factor of two.

21. The method of claim 20 further including producing an Nth doubled sampling rate based on an (Nth-1) doubled sampling rate and digitally filtering the (Nth - 1) doubled sampling rate.

22. The method of claim 13 further including generating a trigger at approximate sampling points of a desired sampling rate.

23. The method of claim 22 further including receiving a value of (x) and the trigger one of every seventh or eighth data value of the upsampled digital data and producing a sampling point estimate value upon receiving the trigger.

24. The method of claim 22 further including receiving a value of (x) and the trigger at a rate that is an integer value that is within ten percent of the value of the total number of times that the digital data was upsampled and producing the sampling point estimate value upon receiving the trigger to provide near-unity sampling rate conversion.

25. The method of claim 23 wherein the value of (x) is specified in a table and wherein the value of (x) is sequentially produced from values listed within the table.

26. The method of claim 25 wherein the specified table includes a total of twenty entries.

27. A sampling rate converter for altering an initial sampling rate to a desired sampling rate resulting in near-unity fractional sampling rate alteration, comprising:

an interpolator for receiving and up-sampling digital data representing a continuous waveform signal, the digital data having an initial sampling rate, wherein the interpolator produces upsampled and filtered data an upsampled rate;

an accumulator that receives a clock at the upsampled rate, the accumulator for determining approximate values of (x) wherein the approximate values of (x) relate to sampling points at the desired sampling rate wherein the accumulator further produces a trigger at the sampling points at the desired sampling rate;

a signal buffer for receiving the upsampled and filtered data at the upsampled rate, the signal buffer for producing buffered samples that is N samples wide wherein N is a value determined by a Richardson formulation for generating derivative estimates;

a derivative estimation block for producing at least two derivative estimates based upon the buffered samples;

a coefficient calculation block for producing polynomial coefficient values based upon the at least two derivative estimates and upon at least two select buffered samples produced by the signal buffer;

a polynomial evaluation block for producing a function value representing an estimated sampling point value, the function value based upon the polynomial coefficient values and the approximate value of (x); and

wherein the derivative estimation block, the coefficient calculation block and the polynomial evaluation block produce outputs based upon the trigger produced by the accumulator.

28. The sampling rate converter of claim 27 wherein the interpolator up samples the digital data eight times and decimates the upsampled data by a factor of 7.35.

29. The sampling rate converter of claim 28 wherein the original sampling rate is 44.1 kHz and wherein the desired sampling rate is 48 kHz.

30. The sampling rate converter of claim 29 wherein the signal buffer captures ten sampling points, the derivative estimation block produces two derivative estimates and the coefficient calculation block produces four coefficient values.